CLUB OF BOLOGNA

PROCEEDINGS
OF THE

1st LATIN-AMERICAN MEETING

Fortaleza (Brazil), July 4, 2000

The future of mechanisation: trends and requirements for the Latin-American countries

11th MEETING *(Part 1)*

Bologna (Italy), November 19 – 20, 2000

New technologies and methods for the evaluation of the quality of perishable agricultural products for the fresh market

11th MEETING *(Part 2)*

Tsukuba (Japan), November 26 - 27, 2000

Ethical aspects in manufacturing agricultural machines

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During the year 2000 the Club of Bologna has for the first time organised and carried out three distinct meetings in so many different countries.

On July 4th in Fortaleza (Brazil) took place the first Latin-American meeting on the occasion of the annual congress of the Brazilian Society of Agricultural Engineering (CONBEA), to debate on: *The future of mechanisation: trends and requirements for the Latin-American countries.*

On November 19th – 20th, during the usual framework of EIMA in Bologna (Italy), was debated the first part of the XI° meeting, discussing on: *New technologies and methods for the evaluation of the quality of perishable agricultural products for the fresh market*

Finally, on November 26th – 27th in Tsukuba (Japan), on the occasion of the XIV CIGR World Congress, the second part of the XI° Club meeting discussed on: *Ethical aspects in manufacturing agricultural machines.*

This volume of Proceedings includes, on sequence, the Conclusions and Recommendations, the introductory Reports and the Discussions of all the three meetings.

1st LATIN-AMERICAN MEETING

Fortaleza (Brazil), July 4, 2000

Conclusions and Recommendations
Conclusioni e Raccomandazioni

Session

The future of mechanisation: trends and requirements for the Latin-American countries

Leading person: ***Irenilza De Alencar Nääs, Brazil***

Annex

Guidelines for the technology transfer in the Developing Countries

GUIDELINES FOR THE TECHNOLOGY TRANSFER IN THE DEVELOPING COUNTRIES

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1. Introduction

Many and different are the patterns of collaboration (**Fig.1**) between industrialised countries (I.C.) and developing ones (D.C.), based on the technology transfer within the agricultural sector, there included tractors and equipment. The choice of one of these patterns much depends on the evaluation of the countries concerned and the companies involved which have to select the transfer modality most appropriate for the particular condition of the D.C. at issue.

As an indication, 8 to 10 different possible solutions (**Fig.1**) are available: from simple technical collaboration, aimed at meeting the country internal market, to increasing levels of technical assistance required, there included growing quantity of locally manufactured parts, up to a full-fledged joint-venture. This means a permanent (or long lasting) technical and financial involvement of the supplying enterprises.

Broadly speaking, the simpler types of co-operation mentioned particularly concern small-medium size enterprises and the simple technologies should only match, in most cases, the needs of the local market. On the contrary a *joint venture*: (often a technical and financial permanent or long lasting association between large, well established firms from I.C., and serious firms from D.C.) implies a comprehensive transfer of technological know-how – including high level, sophisticated equipment - from the I.C., with its financial participation and a rigid, technical control of the local D.C. production, capable to meet the requirements of internal and/or international markets.

2. Key factors for success

The success of these different co-operation forms much depends on:

a) the establishment of good relationship between the concerned parties and their reliability;

b) the mindful appraisal of all external factors in both industrialised and developing countries.

From a broad view-point, even the simplest forms of co-operation would necessarily call for:

- a careful evaluation of the seriousness of both counterparts, as well as the soundness of each productive structure and its marketing prospects;
- a detailed analysis of the local situation as far as materials to be utilised, the spare parts required, the assurance of their continuous supply and availability are concerned beside a clear identification of parts and components that could really be manufactured locally;
- an evaluation of locally available human resources, in both technical and commercial domains.

All this requires the use of locally trained people possibly supported in methods from I.C. In addition a responsibility feeling person (or a group) within the D.C. with a long vision and some resources, is required too.

Dealing with more articulated financial participation patterns and joint-ventures, requires an accurate evaluation of the external conditions, with particular reference to:

a) institutional and economic aspects such as political stability, industrial development policies and investment promotion initiatives in place, intellectual property protection measures, available credit facilities, financial terms applied;

b) social aspects including level of education of management and production staff, after-sale service technicians, final users and farmers;

c) organisational aspects such as the presence of: MIRDC (Metalworking Industry R&D Centres), extension and after-sale services, repair and maintenance facilities and their distribution over the territory, testing and certification centres - AMRTC – for agricultural machinery.

It is necessary to carry out previously an in-depth analysis of these external conditions, mostly linked to the establishment of joint-ventures, but also of interest to firms involved in simpler technical co-operation forms.

3. Institutional and economic constraints

In view of the fact that joint-ventures have long duration, it is indispensable, for the I.C., to look at the legislative framework in place, particularly as it concerns:

a) existing forms of financial support in the D.C. (granting of tax relief, their duration, maximum amount, guarantees insisted);

b) financial support, as well as insurance guarantees against political risks in the D.C.;

c) existing legislation on the intellectual properties and patents.

In various instances, however, the situation may differ, as an I.C. could have more or less interest about credit supports opening and insurance guarantee against political risks in a certain D.C., in association to the general political interest for that specific country, or that defined area.

Similarly, a Developing Country might adopt a different approach, depending on its political situation, economic and social conjunctures, development plans applied, as well as the government willingness to support the transfer at issue.

4. Educational constraints

The achievement of the agreement main economic goal also depends on the educational level of the staff, particularly as it refers to: production, after-sale technical assistance in place and characteristics of the buyers.

In fact, the success of our enterprise much depends on the compatibility and seriousness of the staff directly involved. At manufacturing level the problem concerns technical, administrative, commercial and financial staff as well as labourers, both skilled and unskilled.

The same applies to the personnel in charge of after-sale and technical assistance services. The lack of well trained people at various levels may cause unexpected and insurmountable difficulties that, consequently, may lead to a failure. In any case, also as it refers to the final users, the farmers, it is necessary to offer assistance for improving their technical capability of utilising and maintaining machinery and equipment, beside promoting tailor-made training courses aimed at increasing their knowledge.

5. Organisational constraints

These possible constraints mostly concern the assessment of allied facilities in place, both down and up-stream of production, but tightly linked to it. It means to ensure the presence and the effectiveness of Research and Development Centres in the Metallurgical and Mechanical sector (MIRDC), able to provide technical consulting services to enterprises, as it refers to the utilisation of locally available material, design and manufacturing of machines and relevant components. Such centres frequently exist in the various countries, but sometimes their impact, being little related to real productive needs, is unsatisfactory. Should adequate centres be unavailable, the input of the I.C. needs to be characterised by the highest possible degree of assistance.

The same applies to the Agricultural Machinery Research and Testing Centres (AMRTC) that are entrusted with the identification of the technology most appropriate for the needs of the country and, once implemented, with the assessment of its suitability from both the technical-managerial and the economic view-points.

The results shall be utilised to establish, in co-operation with the local manufacturer, extensive demonstration events and field trials.

Also in this case, the lack of such institutions (usually, but not always, state-owned, and often linked to existing technical high schools or universities) represents a considerable drawback. In fact, as there is no quality assurance for the marketable products, farmers may not have access to easy-terms credits and loans. In addition without an extension services network there's no vulgarisation.

Consequently, the I.C. firm has to provide for these lacks with higher costs and a more articulated organisational pattern even if a company from I.C. is mostly not able to send its best experts for long time to D.C. For that reason, top consulting personalities are often required for selected areas. In these cases a special financial support from I.C. Governments could help the success of the initiative.

6. After-sale services

Last but not least, it is necessary to verify the presence, over the considered territory, of after-sale services and, in particular, a machinery repair and maintenance network. The level of mechanisation, typical of a D.C., calls for the presence of such structures as a key for the success of the enterprise. To this end, not only it is necessary to foster an agreement between the local industry concerned and small local workshops, but also to train their staff, providing the right equipment for the job.

The equipment should possibly include one or more mobile workshops, to enable the technicians to provide assistance on the spot in case of urgent needs. The number of these stationary workshops and their location is closely related to the number of farms in a specific area , but, in general it has proved necessary to have one of them every 40-50 km^2.

Obviously, the production success much depends on this type of organisation, which is a burden for the new enterprises and has to be carefully assessed ahead of any sort of commitment.

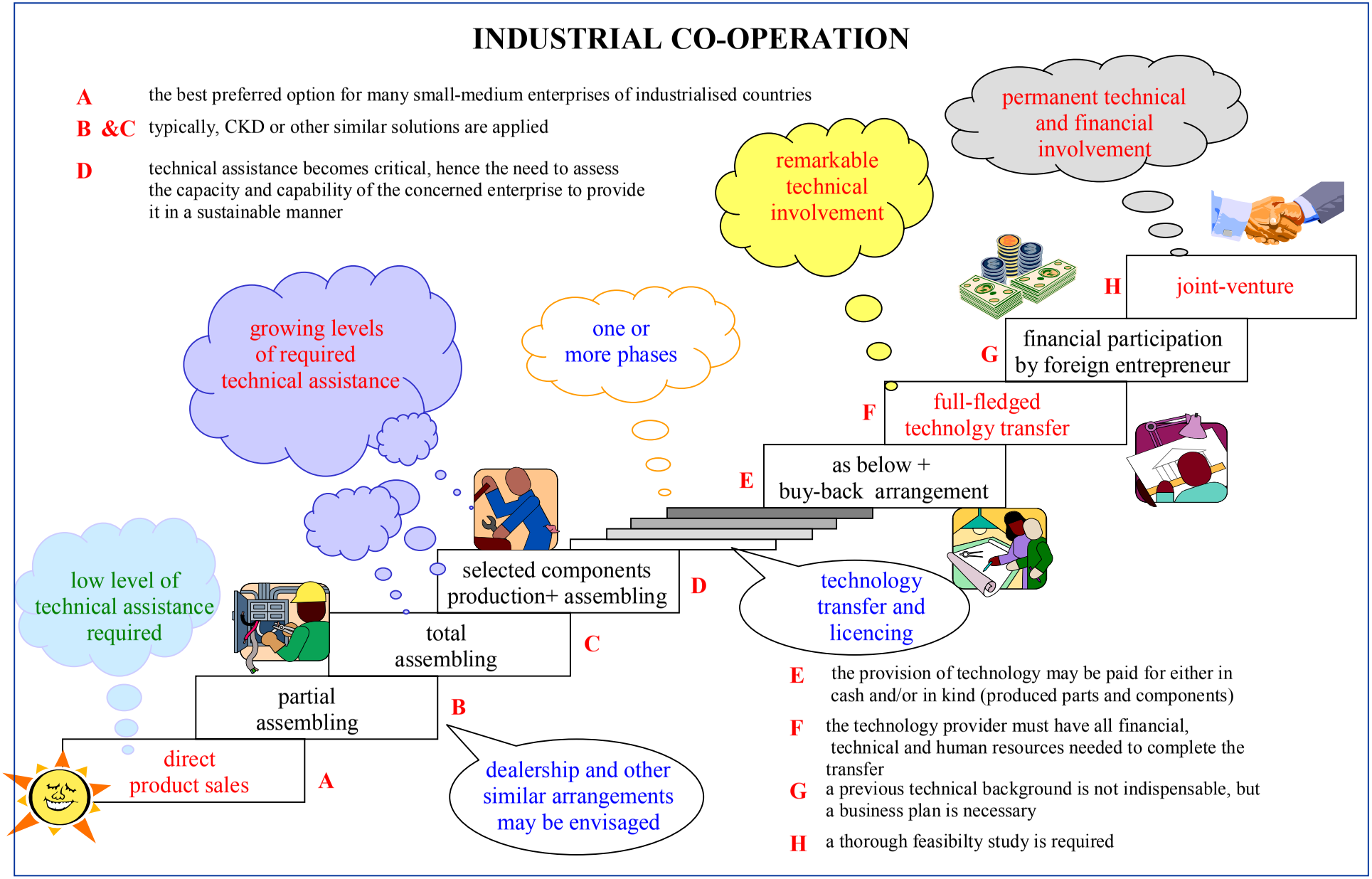

Figure 1 – Different forms of industrial co-operation